

## REMARKS

The above amendments to the specification, claims and abstract have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 449122004700. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

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## **VERSION WITH MARKINGS TO SHOW CHANGES MADE**

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

### **In the Specification:**

Page 1 before the first paragraph, has been amended to include the following insert:

This application claims priority to International Application No. PCT/DE99/03239 which was published in the German language on April 13, 2000.

Page 1 before the first paragraph, please delete the following:

~~Description~~

Page 1, between lines 4 and 5 has been amended to include the following heading:

**TECHNICAL FIELD OF THE INVENTION**

Paragraph beginning on line 5 of page 1 has been amended as follows:

The invention relates to a communications system for radio travel operations ~~as claimed in the preamble of patent claim 1 and can be applied, for example, , and in particular, to a~~ communications system for radio travel operation for railway services.

Page 1, between lines 8 and 9 has been amended to include the following heading:

**BACKGROUND OF THE INVENTION**

Page 1, between lines 8 and 9, has been amended to include the following heading:

Railway operations are frequently controlled using intermittent automatic train control or continuous train control. In the case of intermittent automatic train control, information is transmitted from and to the passing vehicles at devices fixed along the route, for example. In

modern continuous train control, quasi-continuous information transmission is possible from the route to the vehicles, and vice versa. It has already been proposed to transmit the information by radio (known, inter alia, as radio train control). The data which are to be transmitted are made available by interlocking cabins or control centers which also perform all the control functions of the route devices (level crossings, railway switches, railway station devices), the instantaneous location of one or more trains being processed as the most important information.

Paragraph beginning on line 9 of page 1 has been amended as follows:

~~Radio travel operations are a new an operating method with which the “route setting” and “route securing” functions are not implemented on the route, as in the past, but rather on the vehicle. A problem with this is the limited resources in terms of radio channels from the vehicle to the route and the associated long link setup times (typically 20-25 sec. including setup of the securing layer). A plurality of Multiple radio communications has have to be carried out simultaneously from the vehicle as a function of the vehicle speed and the density of vehicle elements, which the vehicle has to set and secure. The radio standard which is provided for railway applications makes available allows for just one radio channel for data communications per terminal. Even if two mobile radio terminals are used on the vehicle, bottlenecks may occur.~~

Paragraph beginning on line 25 of page 1 has been amended as follows:

DE 197 21 246 discloses a ~~communication~~ communications device for radio-supported railway services with which both the data from decentralized control devices and the data of central services can be transmitted to a train with just a single transmission channel. For this purpose, there ~~is~~ are provisions for all this data to be fed to a central gateway computer. The latter then brings about the transmission data to the vehicle. By using a central gateway computer which is assigned to the train, it is possible to transmit all the data in multiplex mode without a new transmission route having to be set up between the vehicle and the central railway services when the train moves forward as a result of the change into a new route region.

Paragraph beginning on line 4 of page 2 has been amended as follows:

Furthermore, in order to avoid long communication paths, DE 198 32 594 (~~GR 98 P 4131~~ ~~DE~~) describes an optimized communication system for radio-supported, continuous train control for radio-supported traffic services, which system has one or more decentralized gateway computers in addition to the fixed, centralized services and the fixed decentralized control points in the traffic network. The communication between the mobile elements and the fixed elements is implemented via the gateway computers, ~~in that in~~ In each case, a representative element is set up for the mobile elements which communicate with the gateway computers, in the gateway computer and in the fixed elements, ~~and for~~ For the fixed elements which communicate with the gateway computers, representative elements are set up directly in the gateway computer or indirectly via at least one information server. The representative information is updated directly in the gateway computer, and in the fixed elements, by means of an update method between the representative elements in the gateway computer and the fixed elements or between the gateway computer and the information server.

Paragraph beginning on line 26 of page 2 has been amended as follows:

This method permits a plurality of logic connections to be multiplexed for a vehicle via a physical radio channel to a gateway, which is associated with a fixed network and which can forward the links to any desired end.point within the fixed network.

Page 2, between lines 29 and 30 has been amended to insert the following headings and paragraphs:

#### SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a communication system for radio travel operations for making radio transmissions of data transmitted in multiplex mode, using at least

one gateway computer, wherein the radio links for the transmission of data between vehicles, route elements and a control center are set up via the gateway computer.

In one aspect of the invention, the communication system for radio travel operations, wherein the vehicles and the route elements are equipped with radio terminals, and the radio terminals also include line-bound communications terminals.

In another aspect of the invention, the communication system for radio travel operations, wherein the vehicles are trains and the route elements are railway switches, track locks, key locks, block or level crossings.

In still another aspect of the invention, the communication system for radio travel operations wherein communication between a plurality of trains and a route element is provided.

In yet another aspect of the invention, the method of communicating using multiplexed data radio transmission. The method transmitting the data in radio links between vehicles, route elements and a control center via at least one gateway computer.

#### BRIEF DESCRIPTION OF THE INVENTION

The invention will be explained in more detail below with reference to one exemplary embodiment which is illustrated at least partially in the figure.

Figure 1 shows a variant of a multiplex link from the vehicle into the control center and to the forwarding to route elements.

#### DETAILED DESCRIPTION OF THE INVENTION

Paragraph beginning on line 30 of page 2 has been amended as follows:

The invention ~~is based on the object of providing~~<sup>is</sup> a communication system for radio travel operations which uses simple means to ~~traffic make possible~~<sup>traffic</sup> reliable data ~~traffie~~ via effective communication paths with just one radio transmission channel between vehicles and

route elements, ~~which~~ This ensures simultaneous communication with a plurality of elements and minimizes expenditure on setting up, updating and maintaining the system.

Paragraph beginning on line 3 of page 3 has been amended as follows:

~~This object is achieved according to the invention by means of the features in the characterizing part of claim 1 in conjunction with the features and the preamble. The subclaims contain expedient embodiments of the invention.~~

Paragraph beginning on line 8 of page 3 has been amended as follows:

A particular advantage of the invention consists in the fact is that a single mobile terminal on one vehicle is sufficient to be able to communicate simultaneously with a plurality of route elements. ~~by virtue of the fact that~~ This is possible because the radio links for the transmission of data from the vehicles to the route elements are not established directly, but rather are set up via a gateway computer. The price paid for this is that  $(n+1)$  radio communications are necessary for communication with  $n$  route elements. Without multiplexing,  $n$  radio communications are necessary for this. A further application of the gateway functionality in radio travel operations on double-track or multi-track routes ~~consists in~~ generally includes setting up communication with level crossings via the gateway computer. This makes ~~is the only way in that~~ it is possible for two or more trains to communicate simultaneously with the level crossing. Without a gateway computer this would have to take place successively, and could lead to operational impediments.

Paragraph beginning on line 29 of page 3 has been amended as follows:

A further advantage of the invention ~~consists in the fact that~~ is the capability of supplying immediate stop instructions which, when necessary, are sent by radio to the vehicles from the radio travel operations control center can also be transmitted immediately via the multiplex channel in regions with a high route element density. This applies also to high-priority data which are sent by broadcast to all receive-end elements of the multiplex channel.

Paragraph beginning on line 1 of page 4 has been amended as follows:

~~The invention will be explained in more detail below with reference to one exemplary embodiment which is illustrated at least partially in the figure.~~

Paragraph beginning on line 4 of page 4 has been amended as follows:

~~Figure 1 shows a variant of a multiplex link from the vehicle into the control center and to the forwarding to route elements~~

Paragraph beginning on line 7 of page 4 has been amended as follows:

Figure 1 illustrates ~~the mechanism by means of~~ an example of a route section composed of two railway switches W1, W2 and a level crossing LC. After the first link request has been implemented from the vehicle F to one of these three route elements (e.g. to the level crossing LC) via the gateway computer, each further link request from the vehicle F to another route element W1, W2 is multiplexed via the same physical link into the control center Z and forwarded from there to the desired route element W1 or W2 or LC.

Paragraph beginning on line 35 of page 4 has been amended as follows:

Each communication is ~~composed~~ comprised of the three following time elements:

Paragraph beginning on line 14 of page 5 has been amended as follows:

For the radio travel operations application, the multiplexing via the gateway computer is completely transparent; i.e. it is not visible which path is being used to forward the link. The telegrams do not differ at the interface to the secure application from telegrams which are forwarded directly (without the detour via the gateway computer) to a route element.

On page 6, line 1, please replace "Patent Claims" with --WHAT IS CLAIMED IS--.

**In the Claims:**

1. (Amended) A communication system for radio travel operations for making radio transmissions of data ~~which is~~ transmitted in multiplex mode, using at least one gateway computer, ~~characterized in that~~ wherein the radio links for the transmission of data between vehicles, route elements and a control center are ~~not established directly but rather~~ set up via the gateway computer.

2. (Amended) The communication system for radio travel operations as claimed in claim 1, ~~characterized in that~~ wherein the vehicles and the route elements are equipped with radio terminals, and the radio terminals also include ~~but the latter are alternatively also equipped with~~ line-bound communications terminals.

3. (Amended) The communication system for radio travel operations as claimed in claim 1, ~~characterized in that~~ wherein the vehicles are trains and the route elements are railway switches, track locks, key locks, block or level crossings.

4. (Amended) The communication system for radio travel operations as claimed in claim 1, wherein one of the preceding claims, ~~characterized in that, if necessary,~~ communication between a plurality of trains and a route element is provided.

5. (New) A method of communicating using multiplexed data radio transmission comprising:

transmitting the data in radio links between vehicles, route elements and a control center via at least one gateway computer.

**In the Abstract:**

Please replace the Abstract in its entirety with the Abstract attached hereto.